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An underpressure generator of blast wave and its application

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Abstract A generator has been designed to generate simulating underpressure of blast wave and applied for the study of underpressure injuries on animals. The generator is composed of a vacuum pump, a hypotensive chamber, an experimental chamber, a membrane-rupturing device and a pressure-measuring system. Its operating principle is as follows:

When the pressure of the hypotensive chamber is being decreased by the drawing of the vacuum pump to a given level, the membrane separating the hypotensive chamber and the experimental chamber is rapidly perforated by a sharp pointer. Underpressure occurs in the experimental chamber where the animal is fixed as soon as the pressure changes instantaneously. The range of the physical parameters of the simulated underpressure are -13 to -90 kPa for the peak level, 1 ms to 90 ms for the decreasing time, and 14 ms to 2000 ms for the duration. Animal experimentation revealed that this device is capable of inflicting injuries and verified the possibility that the underpressure of blast waves can result in injuries.

Key words blast wave; underpressure; blast injury; pulmonary injury

产碱假单胞菌性败血症并多发性肺脓肿、脓气胸一例报告

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产碱假单胞菌引起败血症并多发性肺脓肿、脓气胸临床少见。本文报告一例。

郭某，女性，28 岁，农民。因寒战，发烧 32d，胸痛，气促 20d。于 1991 年 10 月 17 日收入我科。入院查体：体温 38.4℃，脉搏 102 次/min，呼吸 28 次/min，血压 14/10 kPa，面色恍白，懒言。皮肤无黄染，出血点。浅表淋巴结不肿大，气管略向右偏移。左侧胸廓饱满，左上肺叩诊呈鼓音，左下肺呈实音，呼吸音消失。右下肺可闻少许湿罗音。心率 102 次/min，律齐，无杂音。腹软，肝脾未及。辅助检查：WBC 15.2×10^9/L，N 0.90，Hb 7.3 g/L，Bpc 210×10^9/L。肝肾功能正常。胸片示：右侧第三前肋外带可见 1cm×2cm 密度增高影，其间可见液平，中下肺野可见小斑片状影，左侧第四前肋以下大片致密影，可见液平面，其上无肺纹理。抽胸水：外观草黄色混浊液，其间混有少许淡红色液。Rivalta 试验：强阳性，白细胞 6.5×10^9/L，中性 0.92。胸水生化：蛋白 31.8 g/L，糖 0 mmol/L，氯化钠 113 mmol/L。胸液涂片：革兰氏染色，白细胞卅。骨髓检查示感染性骨髓象。胸水培养、痰培养均是纯产碱假单胞菌生长，血培养(－)。诊断：产碱假单胞菌性败血症并多发性肺脓肿、脓气胸。给予氧哌嗪青霉素 8 g/d，丁胺卡那 0.2 肌注 2/d，2d 后体温降至正常。在给抗生素的同时应用生理盐水冲洗胸腔，闭式引流，支持疗法等综合治疗月余。胸片示：脓腔封闭，气体吸收，肺复张，但留有胸膜增厚。痊愈出院。

讨论

假单胞菌属(Pseudomonas)细菌是一组革兰氏阴性无芽胞杆菌，其代表菌是铜绿色假单胞菌(通常称绿脓杆菌)。产碱假单胞菌是假单胞菌属的一种，但不是绿脓杆菌。该菌属广泛存在土壤，水，空气和人体皮肤上[1]，多为条件致病菌[1]，只有在全身抵抗力低下时才感染发病。本例因妊娠足月在家中生产一死

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The effect of aminophylline to strenthen diaphragmatic function in dogs

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Abstract After the bilateral phrenic nerves of the dogs were stimulated, the effect of aminophylline on the function of normal and fatigued diaphragm was observed with the determination of transdiaphragmatic pressure-stmulation frequency curve (Pdi-F), and the analysis of the power spectrum of diaphragmatic electromyogram (DMGdi) at spontaneous breathing. After the administration of 10 and 20 mg/kg of aminophylline, the PDi of the normal diaphragm was increased and that of the fatigued diaphragm recovered. The Pdi-F curve of the fatigued diaphragm was shifted to the left, and the central frequency, the medium frequency, and the high/low frequency ratio were markedly increased. It is concluded that aminophylline at the therapeutic dosage can imporve the generation of the strength and enhance the recovery of the fatigued diaphragm.

Key words aminophylline; diaphragm; transdiaphragmatic pressure; electromyography

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婴而感染。细菌入血经肺形成多发性肺脓肿，因诊断治疗不及时，致使形成脓气胸。

本例临床特点：起病急骤，寒战，高热，体温达40℃，常在下午开始发热，次日上午自行退热，发烧时伴有恶心，呕吐，腹泻，盗汗等中毒症状。退热后症状消失，如同常人。发烧半月后出现胸痛，胸闷，气促，咳嗽伴白色粘痰。X 线检查初期无异常，出现胸痛、气促时发现多处片状实变阴影，继后出现脓气胸征象。血象升高，中性达 0.90 以上。本病主要靠血培养、痰培养及胸水脓汁培养明确病原菌。临床需与金葡菌肺炎、肺结核相鉴别。

选用敏感的抗生素是治疗成败的关键，抗假单胞菌属的抗生素有部分半合成青霉素、第三代头孢菌素类和氨基糖甙类。选用青霉素类或头孢类配 1 种氨基糖甙类抗生素效果更佳。脓肿或脓气胸形成者局部引流和脓腔冲洗甚为重要。辅以支持疗法以增强机体抵抗力。本例综合治疗取得满意效果。

关键词 假单胞菌感染；败血症；肺脓肿；脓气胸

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